

HP StorageWorks Modular Smart Array family



The HP StorageWorks Modular Smart Array (MSA) family delivers simple, affordable, industry-leading technology to provide superior storage performance and enhance investment protection. These robust solutions offer the best price-performance features for direct attach environments, small clusters, and entry-level and mid-range SAN environments. Designed to maximize transfer rates, reduce management costs and drive a rapid return on investment, each solution supports flexible platforms and advanced data protection features. The MSA family offers reliable, cost-effective storage solutions to tackle your most demanding storage needs.



HP StorageWorks Modular Smart Array 1500 controller shelf

The HP StorageWorks Modular Smart Array 1500 (MSA1500) controller shelf is a Fibre Channel SAN attached 2U controller shelf that connects to HP StorageWorks Serial ATA (SATA) and SCSI disk enclosures. It is ideal as a less expensive storage solution where HP SATA enclosures are used to store data that doesn't require high I/O performance and is non-critical to business operations. HP recommends SCSI drives for intensive heavy I/O requirements, while SATA drives should be used in archived, "near-online" disk-to-disk backup configurations. Providing customers with a low-cost, high-capacity storage solution, it is intended as a hardware foundation where future solutions can be designed and implemented. With up to eight attached SATA enclosures, it can provide up to 24 TB (using 96-250 GB SATA disk drives) of native capacity. If the system needs SCSI reliability, attach up to four SCSI enclosures for a native capacity of 16.8 TB (using 56-300 GB SCSI disks).

By utilizing existing SCSI drive enclosures and the HP StorageWorks MSA1000 controller technology, and integrating low-cost HP SATA hard drives and enclosures, the MSA1500 controller shelf lowers total cost of ownership and extends hardware investments.

Key features and benefits

- *Delivers low cost and higher capacity:* 24 TB of capacity (8 SATA shelves) using up to 96-250 GB SATA disk drives or 16.8 TB of enterprise-class SCSI drives (4 SCSI shelves)
- *Features modular 2U rack-mount disk array controller shelf:* offers the ability to attach SCSI and Serial ATA enclosures
- *Supports Advanced Data Guarding (ADG):* produces a fault tolerance level withstanding two simultaneous drive failures without downtime or data loss
- *Utilizes HP StorageWorks MSA20 or MSA30 enclosures for capacity expansion*

HP StorageWorks Modular Smart Array 1500 controller shelf



Modular Smart Array 1500 controller shelf		• <i>Controller cache:</i> 256 MB per controller standard, expandable to 512 MB • <i>Host ports per SCSI Module:</i> Two ports available on a Dual-Channel SCSI I/O Module; one port for either SCSI or SATA and the second port for SATA only; up to three more SCSI I/O Modules can be added for a total of eight ports. • <i>Host interface:</i> Fibre Channel, optical with Small-Form-Factor-Pluggable (SFP) Transceiver, autosense between 2 Gb and 1 Gb • <i>Host ports per controller:</i> 1 Fibre Channel I/O Module per controller; a second Fibre Channel I/O Module can be added along with a second controller for redundancy and failover • <i>RAID levels:</i> RAID ADG (Advanced Data Guarding); RAID 5 (Distributed Data Guarding); RAID 1+0 (Striping and Mirroring); RAID 0 (Striping) • <i>Maximum disks supported:</i> 96 SATA disks in 8 enclosures or 56 SCSI disks in 4 enclosures; mixing SATA and SCSI enclosures behind the same controller is available but not on the same SCSI I/O Module. • <i>Fibre Channel switches:</i> HP StorageWorks SAN Switch 2/24, 2/16; Core Switch 2/64; Edge Switch 2/16, 2/24, 2/32; Director 2/64, Director 2/140; SAN Switch 2/8V (See QuickSpecs at: www.hp.com/go/msa for a full configuration list.) • <i>Sustained I/O and MB throughput:</i> up to 30,000 IOPS; up to 200 MB/s data transfer • <i>Redundant fans and power supplies:</i> Yes • <i>Environmental monitoring:</i> Yes, monitors power supplies, fans, temperature within the controller shelf • <i>Management software:</i> HP Systems Insight Manager; Selective Storage Presentation (SSP); Array Configuration Utility (ACU) • <i>Disk drives, interface:</i> SCSI and SATA disk drives attached by SCSI interface
Configuration ordering information		For complete ordering information, visit: www.hp.com/go/msa .
Step 1—Order required items	AA986A	MSA1500 controller shelf
	AA987A	MSA1500 Fibre Channel I/O Module*
	AA988A	MSA1500 Dual-Channel SCSI I/O Module*
		*Note: The MSA1500 includes one Fibre Channel I/O and one Dual-Channel SCSI I/O. Additional Modules are only needed if adding an extra controller and more than one SCSI or two SATA shelves.
Step 2—Controller, hard drive and enclosure options		
Step 3—Choose HP Care Pack Services		
What's included	MSA1500 2U controller shelf, one MSA1000 controller with 256 MB cache, one Fibre Channel I/O Module with 2 Gb SFP shortwave Transceiver, one Dual-Channel SCSI I/O Module, redundant hot-pluggable power supplies, redundant hot-pluggable fan modules, Universal Rackmounting Kit, MSA1500 support CD and documentation, two power cables Note: Fibre Channel cables are ordered separately.	



HP StorageWorks Modular Smart Array 1000

The HP StorageWorks Modular Smart Array 1000 (MSA1000) is a 2 Gb Fibre Channel storage system offering the best price-performance features for direct attach environments, small clusters, and entry-level and mid-range SAN environments. Designed to maximize transfer rates, each solution reduces management cost, while driving a rapid return on investment. Reducing the complexity, expense and risk of SAN deployment, the MSA1000 is a scalable, high-performance storage system. Its modular design allows you to increase storage capacity as needed. With the addition of two HP StorageWorks MSA30 disk enclosures with a combined space for 42 enterprise-class drives, maximum storage capacity is 12 TB. All configuration and management programs are included, and there are no unexpected charges for extra licenses as your capacity needs grow, or as you attach more servers. The MSA1000 is ideal for Microsoft® Exchange servers, file and print duties, and small to medium database applications.

Key features and benefits

- *Features high-performance controller(s) built on DAS to SAN (DfS) architecture:* allows a quick and easy way to migrate stored data protected by most Smart Array controllers
- *Offers a wide range of operating system support:* includes Microsoft Windows®, HP-UX, Linux®, NetWare, OpenVMS and Tru64 UNIX®
- *Supports a broad selection of servers:* supports 32-bit and 64-bit HP ProLiant and Integrity models along with AlphaServer systems, HP PA-RISC systems and a host of industry-standard x86 units
- *Features integrated configuration and management tools:* utilizes a standard, integrated set of management and utility software
- *Utilizes MSA30 enclosures for capacity expansion*

HP StorageWorks Modular Smart Array 1000



Modular Smart Array 1000	• <i>Interface:</i> Ultra3 SCSI to hard drives, 2 Gb Fibre Channel to hosts • <i>Maximum number of drives:</i> 14, 1-inch HP Ultra2, Ultra3 or Ultra 320 Universal Hard Drives (MSA1000 cabinet); expandable to 42 using two additional HP StorageWorks MSA30 enclosures • <i>SCSI ports (4-channel):</i> two internal, two external • <i>Drives supported:</i> Up to 42 drives • <i>Maximum capacity:</i> 12 TB (42 drives x 300 GB) • <i>Maximum logical drive size:</i> 2 TB • <i>Logical drives:</i> Up to 32 logical drives	
Modular Smart Array 1000 controller	• <i>RAID support:</i> Advanced Data Guarding (ADG); RAID 5 (Distributed Data Guarding); RAID 1+0 (Striping and Mirroring); RAID 0 (Striping) • <i>Cache memory:</i> Up to 512 MB read/write (256 MB modules); if redundant controllers are used they must have equally configured cache ECC protection, battery-backed and removable; 256 MB cache memory (single module) is standard. • <i>Disk drive and enclosure Protocol support:</i> HP Ultra 320, Ultra3 and Ultra2 SCSI 1-inch Universal drives	
Modular SAN Array Fibre Channel I/O Module	• <i>Connector type:</i> LC • <i>Number of Fibre Channel ports:</i> One 2 Gb Fibre Channel Port using removable SFP Transceiver • <i>Bandwidth:</i> up to 200 MB/s • <i>Protocols supported:</i> Fibre Channel	
MSA SAN Switch 2/8 (integrated)	This full fabric, high-speed Fibre Channel switch option installs in the MSA1000 giving full switch functionality while saving valuable rack space. It comes with four SFPs installed. Two switches may be put in when a second controller is installed for redundancy. Performance: 2.125 Gb/sec line speed, full duplex; Interoperability: all HP StorageWorks B-Series SAN switches	
MSA Hub 2/3 (integrated)	The HP StorageWorks MSA Hub 2/3 is a low-cost interconnect designed for clustering or low-cost, high-speed attachment of two servers to the MSA1000. The MSA Hub 2/3 is a 3-port Fibre Channel Arbitrated Loop hub that is mounted on a blade that easily installs inside the MSA1000 storage unit, saving valuable rack space. Two of these hubs may be installed for redundancy within the MSA1000.	
MSA1000 Kits	353803-B22	MSA1000 SAN Starter Kit (Microsoft Windows or Linux compatible); includes: MSA1000, MSA SAN Switch 2/8, two FCA2214 HBAs and cables
	353804-B21	MSA1000 High Availability Upgrade Kit for Windows (for SAN Starter Kit); includes: redundant controller; MSA SAN Switch 2/8, two FCA2214 HBAs, cables plus an HP ProLiant HA/F200 kit with HP StorageWorks
	353805-B21	Secure Path for two servers, designed as an upgrade for the MSA1000 SAN Starter Kit
	A7450A	MSA1000 High Availability Upgrade Kit for Linux (for SAN Starter Kit); includes: redundant controller; MSA SAN Switch 2/8, two FCA2214 HBAs, cables plus Secure Path for Linux Workgroup Edition for two servers, designed as an upgrade for the MSA1000 SAN Starter Kit
	A7452A	MSA1000 Small Business SAN Kit (Microsoft Windows and Linux 32-bit compatible); includes: one MSA1000 enclosure, one MSA1000 controller, one 2/8q 2Gb Fibre Channel Switch (external), two HP Q200 FC HBAs, redundant power supplies, fans, cables, optics, rails, documentation and SAN software installation, management and configuration CD
Configure-to-Order (CTO) Program information	HP introduces the new Configure-to-Order Program on a limited basis. It is not yet available in all areas. The MSA1000 and its options may now be ordered factory installed in a rack with add-on controllers, switches, hubs, MSA30 enclosures and hard drives. The MSA1000 may be integrated with BCS servers, HP ProLiant servers or as standalone storage.	
Configuration ordering information	For complete ordering information, visit: www.hp.com/go/msa1000 .	
Order required items	201723-B22	MSA1000
Choose redundant MSA1000 system options	218231-B22	2nd MSA1000 Controller
	218960-B21	MSA Fibre Channel I/O Module
If desired, replace FC I/O Module with optional integrated interconnect (2 if redundant controller added)	286763-B21	MSA Hub 2/3 (integrated)
	288247-B21	MSA SAN Switch 2/8 (integrated)
What's included	MSA1000 controller with 256 MB cache, one MSA Fibre Channel I/O Module with 2 Gb SFP shortwave Transceiver, redundant hot-pluggable power supply/blower assemblies, Universal Rackmounting Kit, MSA1000 support CD and documentation, serial cable and two power cables	



HP StorageWorks Modular Smart Array 500 G2

The HP StorageWorks Modular Smart 500 G2 (MSA500 G2) is designed specifically for clustering and storage sharing. MSA500 G2 architecture reduces complexity and expense for clustering and storage sharing. It is built on familiar Smart Array and HP ProLiant technologies and is an Ultra320 SCSI storage system, supporting up to 4.2 TB of data capacity. The MSA500 G2 provides advanced data protection features that are simple to deploy, configure and manage. Plus, the MSA500 G2 converts to a SAN array for additional scalability, providing extended hardware investment protection into the future. The Smart Array architecture offers a quick and easy way to migrate from the MSA500 G2 to the MSA1000 for additional scalability. Combining the array controller shelf and the drive shelf, the MSA500 G2 holds up to 14 HP Universal Disk Drives in a single 4U rack-mount cabinet to provide over 4.2 TB of storage.

Key features and benefits

- Offers new *Rapid Drive Rebuild technology*: increases speed of RAID 5 and RAID ADG drive rebuilds
- Features *Selective Storage Presentation (SSP)*: provides storage sharing with multiple servers (LUN Masking)
- Supports 14 Ultra320, Ultra3 and Ultra2 HP Universal Drives: delivers 4.2 TB capacities (14 HP Universal Disk Drives of 300 GB)
- Provides *pre-failure warranty that covers disk drives*: protects IT investment
- Features *the ability to boot from storage*: transfers all disks to external storage for best capacity utilization
- Delivers cluster support for Microsoft, Linux and NetWare

HP StorageWorks Modular Smart Array 500 G2



Modular Smart Array 500 G2

- **Interface:** Ultra320 SCSI to hard drives, Ultra320 SCSI to host servers
- **Maximum number of drives:** 14, 1-inch Ultra320, Ultra3 or Ultra2 Universal Hard Drives (Modular Smart Array 500 G2 cabinet)
- **Ports:** 2-port SCSI I/O – two VHDCI Ultra320 SCSI ports

Modular Smart Array 500 G2 Controller

- **Protocol support:** Wide Ultra320 SCSI (320 MB/s per channel)
- **SCSI channels:** four total, two Ultra320 SCSI channels supporting up to four host servers, two Ultra320 SCSI channels supporting 14 disk drives (seven drives per channel), 640 MB/s maximum transfer rate
- **Drives supported:** Up to 14 drives
- **Maximum capacity:** 4.2 TB (14 drives x 300 GB)
- **Logical drives:** Up to 32 logical drives
- **RAID support:** RAID ADG (Advanced Data Guarding); RAID 5 (Distributed Data Guarding); RAID 1+0 (Striping and Mirroring); RAID 1 (Mirroring); RAID 0 (Striping)
- **Cache memory:** Standard 256 MB read/write cache; up to 512 MB read/write with second 256 MB cache module; ECC protection, battery-backed and removable. Note: The Modular Smart Array controller allows the following cache configurations: 1 x 256 MB; 2 x 256 MB. When redundant controllers are installed, the cache configurations in both controllers must be identical.
- **Disk drive and enclosure Protocol support:** HP Ultra320, Ultra3 and Ultra2 SCSI 1-inch Universal drives

Smart Array 642 Adapters

- **Protocol:** Ultra320 SCSI
- **SCSI port connectors:** one external and one internal SCSI port
- **Channel transfer rate:** 640 MB/s total, 320 MB/s per channel
- **PCI Bus speed:** 64-bit, 133 MHz PCI-X (1 GB/s maximum bandwidth)
- **PCI:** 3.3 volt CPI slot compatibility only

MSA500 G2 4-port I/O Module (option)

- **Connector type:** VHDCI Ultra320 SCSI
- **Ports:** four Ultra320 SCSI
- **Bandwidth:** 320 MB/s per port
- **Protocols/HBA supported:** Ultra320, Ultra3 and Ultra2 SCSI/Smart Array 642, Smart Array 6i adapters

MSA500 G2 High Availability Kit

This kit provides everything you need to add full redundancy to your MSA500 G2 or support for up to four servers. It includes one MSA500 G2 controller, one MSA500 G2 4-port I/O Module, two Smart Array 642 Adapters, Smart Array Multipath I/O software and two 6-foot SCSI cables.

Configuration ordering information

For complete ordering information, visit: www.hp.com/go/msa.

Step 1—Order required items

335880-B21

HP StorageWorks Modular Smart Array 500 G2 (includes 2 HBA adapters)

Step 2—Choose Modular Smart Array 500 G2 system options

Step 3—Choose HP ProLiant server(s)

Step 4—Choose SCSI Disk Drive(s)

Step 5—Choose Rack Option(s)

Step 6—Choose HP Care Pack Services

Optional DAS to SAN (D2S) expansion and SAN conversion options are available.

What's included

MSA500 G2 chassis, MSA500 G2 controller with 256 MB cache, 2-port Ultra320 SCSI I/O Module, redundant hot-pluggable power supply/blower assemblies, two HBAs – Smart Array 642 Adapters, Modular Smart Array 500 G2 Rackmounting Kit, MSA500 G2 support software or HP SmartStart, two power cables, two VHDCI SCSI cables (6-ft. each), crossover Ethernet cable for clustering and user manual



HP StorageWorks Modular Smart Array 30 SB/DB

The HP StorageWorks Modular Smart Array 30 (MSA30) offers a flexible, universal storage enclosure for data center, departmental and workgroup server users. It utilizes common storage building blocks to ensure current and future needs are met. The MSA30 is intended for use with servers delivering business-critical data, and applications with requirements for high availability, performance, serviceability and large storage capacity. The MSA30 with an HP Ultra320 SCSI disk drive storage enclosure delivers industry-leading data performance, availability, storage density and technology that upgrade easily to fulfill increasing storage requirements. The MSA30 supports up to 14 Ultra2, Ultra3 or Ultra320 Universal Hard Disk Drives, and provides storage capacity of up to 4 TB per enclosure (using 300 GB 1-inch disk drives).

Key features and benefits

- *Features Single Connect Attach (SCA) direct connect drive carrier:* provides better cooling and reliability for 10K and 15K drives
- *Supports Ultra320 Low Voltage Differential (LVD) hosts:* delivers maximum transfer rates of up to 320 MB/s
- *Houses up to 14 enclosures in one 42U rack:* supplies a single rack storage capacity of up to 58.8 TB of disk storage
- *Now offers support for the HP-UX*
- *Increases storage density:* is used as an expansion option for the MSA1000 and MSA1500

HP StorageWorks Modular Smart Array 30 SB/DB



Modular Smart Array 30 SB/DB		• <i>Protocol support:</i> Wide Ultra320 (LVD), Wide Ultra3 (LVD), Wide Ultra2 (LVD) controllers and adapters supported models, 4414R, 4454R: Smart Array 6402/256; Smart Array 5302/128; Smart Array 5312; Smart Array 5304/256; Smart Array 642; Smart Array 532; Smart Array 5i/5i Plus. Note: Single external SCSI channel is supported on select HP ProLiant servers. See Server QuickSpecs at: www.hp.com/go/msa for specific model information. HSG80 Controller; 64-Bit/66 MHz Dual-Channel Wide Ultra3 SCSI Adapter, Alternative OS; 1-channel Wide Ultra2 Adapter (AlphaStations); 1-channel Wide Ultra2 Adapter (HP AlphaServer systems). See your server and controller compatibility matrix for details on controller and server compatibility. • <i>Maximum number of drives:</i> 14 Ultra2, Ultra3 or Ultra320 Universal Hard Disk Drives • <i>I/O Module connector:</i> VHDCI • <i>Maximum capacity:</i> 4 TB per enclosure (using 300 GB 1-inch disk drives)
Configuration ordering information		For complete ordering information, visit: www.hp.com/go/msa .
Step 1—Order required items	302969-B21 302970-B21	MSA30 single bus (SB) MSA30 dual bus (DB)
Step 2—Choose controllers and adapters		
Step 3—Choose power options		
Step 4—Choose rack options		
Step 5—Choose SCSI options		
Optional upgrade options available		
What's included		Model MSA30 SB: Redundant power supplies, single bus I/O Module, 14 drive blanks, warranty card, mounting hardware, MSA30 user guide, Environmental Monitoring Unit (EMU) booklet, HP SmartStart CD Kit, documentation CD, one 12-ft. VHDCI to VHDCI SCSI cable and two IEC-C13 power cords with IEC-320-C13 plug Model MSA30 DB: Redundant power supplies, dual bus I/O Module, 14 drive blanks, warranty card, mounting hardware, MSA30 user guide, EMU booklet, HP SmartStart CD Kit, documentation CD, two 12-ft. VHDCI to VHDCI SCSI cables and two IEC-C13 power cords with IEC-320-C13 plug



HP StorageWorks Modular Smart Array 30 MI

The HP StorageWorks Modular Smart Array 30 Multi-Initiator (MSA30 MI) builds on the MSA30 design by adding a 4-port I/O Module for the MSA30 to support Multi-Initiator JBOD (Just a Bunch of Disks) Clusters. The MSA30 MI will replace the DS2300, and it supports HP-UX and 64-bit Linux operating systems on HP Integrity and HP 9000 servers only. The MSA30 MI does not support HP ProLiant servers.

The MSA30 MI also supports HP Serviceguard software on HP-UX. HP Serviceguard monitors the health of each node and rapidly responds to failures in a way that minimizes or eliminates application downtime.

Key features and benefits

- *Features higher performance:* Ultra320 SCSI transfer rates combined with the highest spindle count per U of rack space allows the MSA30 to achieve the greatest I/Os per second.
- *Provides high availability:* HP Serviceguard software maximizes application availability while protecting data integrity.
- *Increases storage capacity:* 3U rack form factor allows customer to achieve the maximum storage capacity per square foot in the data center.
- *Simplifies upgrading:* Single, dual bus or 4-port I/O upgrade modules make upgrading the StorageWorks 4200/4300 Enclosure to Ultra320 quick and easy.
- *Delivers investment protection:* With the ability to upgrade, as well as mix and match, existing Ultra2 and/or Ultra3 components with Ultra320, HP makes technology transitions simple and cost effective, and has simplified the transition to the next generation SCSI protocol.
- *Reduces spares inventory:* Universal drives and drive carriers across HP's entire Ultra2, Ultra3 and Ultra320 product offering allow the same drives to be used in servers and external storage.

HP StorageWorks Modular Smart Array 30 MI



Modular Smart Array 30 MI	• <i>Protocol support:</i> Ultra320 (LVD) host support, delivering compatibility with sixth-generation Smart Array controllers • <i>Interface:</i> Ultra320 SCSI – Ultra320 device will transfer data up to 320 MB/s • <i>Maximum number of drives:</i> 14, 1-inch Ultra 2, Ultra3 or Ultra320 Universal Hard Drives • <i>SCSI ports/channels:</i> four external SCSI ports • <i>Drives supported:</i> Ultra 2, Ultra3 or Ultra320 Universal Hard Drives • <i>Maximum capacity:</i> 4.2 TB per enclosure (using 300 GB 1-inch Ultra320 hard drives)	
Configuration ordering information	For complete ordering information, visit: www.hp.com/go/msa .	
Step 1—Order required items	359645-B21	MSA30 single bus (MI)
Step 2—Choose controllers and adapters		
Step 3—Choose power options		
Step 4—Choose rack options		
Step 5—Choose SCSI options		
Optional upgrade options available		
What's included	Redundant power supplies, 4-port I/O Module, 14 drive blanks, warranty card, mounting hardware, MSA30 user guide, EMU booklet, HP SmartStart CD Kit, documentation CD, four 12-ft. VHDCI to VHDCI SCSI cables and two IEC-C13 power cords with IEC-320-C13 plug	



HP StorageWorks Modular Smart Array 20

The HP StorageWorks Modular Smart 20 (MSA20) provides an ideal mix of low cost and high capacity for minimum I/O workloads such as reference data, archival and disk-to-disk backup. This SATA 1.5 Gb/s disk drive storage enclosure with Ultra320 SCSI host connectivity offers industry-leading availability, storage density and upgradeability to meet growing storage demands. Offering 2U rack height and a design that allows up to 21 enclosures to be mounted in one 42U rack for a single rack storage capacity of up to 63 TB of disk storage (JBOD configuration), or up to 8 enclosures in an MSA1500 configuration for 24 TB storage capacity in an entry-level SAN. The MSA20 is a flexible platform that lets you buy additional capacity, as you need it.

Key features and benefits

- *Features SATA 1.5 Gb/s disk drives:* delivers data transfer rates greater than 100 MB/s
- *Supports Ultra320 (LVD) hosts:* provides compatibility with sixth-generation Smart Array controllers
- *Provides hot-pluggable disk drives and redundant power supplies:* offers a high level of data protection
- *Offers a common storage platform:* allows future storage consolidation to a SAN
- *Increases storage density:* used as an expansion option for the MSA1500

HP StorageWorks Modular Smart Array 20



Modular Smart Array 20	• <i>Interface:</i> SATA 1.5 Gb/s to hard drives, Ultra320 SCSI to host servers • <i>Maximum number of drives:</i> 12, 1-inch SATA 1.5 Gb/s Universal SATA Hard Drives (Modular Smart Array 20 cabinet)	
Smart Array 6402/128 and 6404/256 controller	• <i>Electrical interface:</i> LVD • <i>Protocol support:</i> Ultra320 SCSI (320 MB/s per channel) • <i>SCSI ports (2-channel model):</i> two external/two internal shared • <i>SCSI ports (4-channel model):</i> four external/two internal shared • <i>Drives supported (2-channel model):</i> up to 28 drives • <i>Drives supported (4-channel model):</i> up to 56 drives • <i>Maximum capacity (2-channel model):</i> 8.4 TB (28 drives x 300 GB) • <i>Maximum capacity (4-channel model):</i> 16.8 TB (56 drives x 300 GB) • <i>PCI:</i> PCI-X and 3.3 volt PCI compatibility only • <i>Note:</i> The HP Smart Array 6400 controller is not supported in 5 volt PCI slots. • <i>PCI bus Speed:</i> 64-bit/133 MHz PCI-X (1 GB/s maximum bandwidth)	
Smart Array 642 controller	• <i>Dimensions:</i> 12.3 x 4.2 x 0.6 in (31.24 x 10.7 x 1.5 cm) • <i>Protocol support:</i> Ultra320 SCSI • <i>SCSI electrical interface:</i> LVD • <i>Drives supported:</i> up to 20 (6 internal and 14 external) Ultra320, Ultra3 and Ultra2 SCSI hard drives • <i>SCSI port connectors:</i> HP Smart Array 642 one external one internal SCSI port • <i>Data transfer method:</i> 64-bit PCI bus-master • <i>PCI bus speed:</i> 64-bit, 133 MHz PCI-X (1 GB/s maximum bandwidth)	
Smart Array 6i controller	• <i>Protocol support:</i> Ultra320 SCSI • <i>Processor:</i> 405 Power PC • <i>XOR engine:</i> Hardware-based XOR calculations for RAID 5 • <i>Electrical interface:</i> LVD • <i>Total SCSI channels:</i> 2 (Depending upon server Model) • <i>SCSI port connectors:</i> 68-pin wide SCSI connector • <i>Memory:</i> DDR 266 MHz CL2, 64 MB of DDR SDRAM used for code, transfer buffers and read cache comes standard. Upgradeable to 192 MB with 128 MB BBWC Option kit. • <i>Peak transfer rate:</i> 320 MB/s per SCSI channel	
MSA20 Starter Kit	366172-B21	Includes: MSA20 Controller Module with Ultra320 SCSI I/O host connectivity, dual hot-pluggable fans/power supplies, two power cables, one Ultra320 SCSI host adapter (HP Smart Array 6402) and one 3-ft. VHDCI SCSI cable
Configuration ordering information	For complete ordering information, visit: www.hp.com/go/msa .	
Step 1—Order required items	335921-B21	MSA20
Step 2—Choose controllers and adapters		
Step 3—Choose HP ProLiant server(s)		
Step 4—Choose SCSI cable options		
Step 5—Choose hard drives		
Step 6—Choose rack options		
Step 7—Choose HP Care Pack Services		
What's included	MSA20 Controller Module with Ultra320 SCSI I/O host connectivity, dual hot-pluggable fans/power supplies, two power cables, one Ultra320 SCSI host adapter (HP Smart Array 6402) and one 3-ft. VHDCI SCSI cable	

HP StorageWorks Modular Smart Array family

Warranty	3-year limited warranty. Refer to HP's Limited Warranty Statement for further details. <i>Warranty upgrade options:</i> Response—Upgrade On-Site Response from Next-Business-Day to Same-Day 4-hours; Coverage—Extend hours of coverage from 9 hours x 5 days to 24 hours x 7 days; Duration—Select duration of coverage for a period of 1, 3 or 5 years. <i>Storage services packages:</i> HP Care Pack is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage. HP Care Pack is not available for less than the product's warranty duration. HP Care Pack is available for sale anytime during the warranty period for most products, but the commencement date will be the same as the warranty start date (delivery date to end user customer). Proof of purchase may be required. HP Care Pack Services are prepaid. <i>Software product services:</i> HP warrants only that the software media will be free of physical defects for a period of ninety (90) days from delivery. Product support provides the customer access to HP's experienced technical support resources, as well as access to HP's Information Services database for support on a variety of multi-vendor/multi-platform software products. Product support includes escalation and problem coordination with the appropriate engineering group. HP Services offer a variety of options to allow you to tailor your product service to meet the needs of your organization. Basic warranty on products can be uplifted from day one to ensure you receive the service you need when you need it. <i>HP Care Pack Services:</i> The following services are offered as HP Care Pack Services at the time of software product order: • Software Technical Support 24x7 (1 year and 3 years) is available 24-hours per day, Monday through Sunday, including holidays (includes phone-in software technical support 24x7 and software product and documentation updates). • Installation Service (software installation) and Installation and Startup Service (software installation, configuration, startup testing and knowledge transfer) • HP Care Pack Services must be ordered with the product and are prepaid. • For tailored support contracts based on personalized statement of work, contact your local support center at www.hp.com/support. <i>Secure Path software services:</i> Software product services included with Secure Path: 1 year of Software Technical Support 24x7 HP Care Pack Services (includes phone-in software technical support 24x7 and software product and documentation updates); HP Care Pack Services are available to upgrade the 1 year of Software Technical Support 24x7 included with the Secure Path product to 3 full years; Installation Service (software installation) For additional software product services information for North American HP Care Pack Services, as well as orderable part numbers: All storage services: www.hp.com/hps/storage/ All HP Care Pack Services: www.hp.com/hps/carepack/storage/cp_networked.html Software Support HP Care Pack Services: www.hp.com/hps/carepack/software/cp_storage.html Installation and Startup Services: www.hp.com/hps/storage/ns_implementation.html Maintenance releases, bug fixes and software patches are available at: http://h18006.www1.hp.com/storage/sanworks-support.html For additional hardware installation and maintenance information, please refer to: http://h18005.www1.hp.com/services/carepack/us/install/ or http://h18005.www1.hp.com/services/carepack/us/hardware/
Financial services	HP Financial Services provides innovative financing and financial asset management programs to help you cost-effectively acquire, manage and ultimately retire your HP solutions. For more information on these services, please contact your HP sales representative, or visit: www.hp.com/go/hpfinancialservices.
For more information	For more information on HP StorageWorks Modular Smart Array products, contact any of our worldwide sales offices, or visit: www.hp.com/go/msa.





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